

National Climatic Data Center

DATA DOCUMENTATION

FOR

DATASET 6104(DSI-6104)

NMC Global GTS - Surface Land

March 10, 2004

National Climatic Data Center
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1. **Abstract:** This office note describes the format for surface reports in the NMC observational files. This revision represents the final update to NMC/NCEP Office Note Number 124. This format for representing meteorological surface observational data at NMC (later NCEP) was discontinued in March 1997 when WMO FM 94-IX Code Form: Binary Universal Format for the Representation of meteorological data (BUFR) became operational at NCEP. WMO BUFR remains the official observational data format at NCEP. An accurate version of this Office Note is still necessary for historical reference. This revision incorporates corrections and expansion of the table specifying report type and additional data code figures for certain meteorological parameters which were previously unspecified.

Revision Number 3 (dated 2/1996) had also incorporated some minor corrections and additions since Revision 2 which had been made necessary by the January 1, 1982 synoptic code change. The specifics of this change are explained in detail.

Information contained in the NMC observational surface synoptic reports consists of combinations from the IBM EBCDIC character set. A negative value is indicated by a minus (-) sign located in the leftmost position. A positive value is unsigned.

A report is composed of two main parts: (1) the report identification group of fixed length (50 characters), and (2) the bookkeeping and the observational data of variable length. Each report consists of 70 characters or more.

The information contained in the report identification group is given in APPENDIX S.1. The last parameter in this group contains the total number of ten-character words in the report and thus provides the linkage from one report to the next so that several reports may be contained in a block. The report identification group is followed by the category/counter and observational data groups as needed. The format of the category/counter groups is described in APPENDIX S.1. Observational data is formatted according to the categories described in APPENDIX S.2. Where no data of a given category exist, the category/counter group as well as the data will be absent from the report. The final group in a report contains the ten characters "END REPORT". The number of characters in each category of data is evenly divisible by 10 and the character "X" is used as fill if necessary. Because of this and the length of the groups, the number of characters in a report (including the "END REPORT") is also evenly divisible by 10. Reports are formatted such that the "END REPORT" signal is found in the same block as the beginning of that report.

Following are the modifications made necessary by the introduction of FM 12-VII and FM 13-VII January 1, 1982:

- (1) The code figures for i_R , i_W , and i_X are placed into character characters 25, 26 and 27 respectively of the report identification group.
- (2) The second character of past weather W_2 , is located in the 36th character of category 51. (This location was previously assigned to the quality mark of the dewpoint depression.) The exception is when a manual **P**, **H** or **C** flag is assigned to the dewpoint

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depression, in which case this character is the quality mark of the dewpoint depression.

- (3) Category 08 code figures 110-149 give section and group number information. For example, code figure 136 means the data are from a 6-group in section 3 of FM 2-VII or FM 13-VII.
- (4) Section 5 of WMO code FM 12-VII is stored in category 09. These data are indicated by a 5 in the first character of the first group only. The hourly (SA) data remarks section is stored in category 09 indicated by a 1 in the first character of each group.
- (5) Pressure level indicator 1 has changed meaning from 1000 gpm to 1000 mb. (Several of the old indicators are no longer used.)
- (6) t_R , the length of time covered by the $6RRRt_R$ group is located in the 12th character of category 52. (This location was previously assigned to R_t , time precipitation began.)
- (7) Period of swell waves in category 52 has changed from a code figure to seconds.
- (8) The unit of wave height in category 52 has changed from half-yard to half-meter.
- (9) The units of 24-hour pressure change have been changed from a code figure to tenths of millibars. If the pressure change is less than zero the value stored is the absolute value (in tenths) plus 500.
- (10) Certain reports are actually converted hourlies (stored with block station identification and report type 511). The 37th character of the report identification group indicates whether the report is a converted hourly or a regular synoptic report (1=hourly, 9=regular synoptic).
- (11) Hourly reports (stored with call letter identification and report type 512) have experienced no changes due to the January 1, 1982 code change.

2. Element Names and Definitions:

Report Identification (40 Characters)

| Character Numbers | Parameter | Unit | Remark |
|-------------------|------------------------|-----------------------|--------------------------|
| 1-5 | Latitude* | Hundredth of a degree | Negative in S.H. |
| 6-10 | West longitude* | Hundredth of a degree | Values 00000 to 35999 |
| 11-16 | Station identification | Alphanumeric | Left aligned, blank fill |
| 17-20 | Observed time* | Hundredth of an hour | Values 0000 to 2399 |
| 21-24 | Receipt time* | Hundredth of an hour | Values 0000 to 2399 |

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|-------|---|-------------------|-------------------------|
| 25-17 | Flags Ir, Iw, Ix | | |
| 28-30 | Report type | | |
| 31-35 | Station elevation* | Meter | Negative if < sea level |
| 36 | Synoptic format flag land synoptic only | | New=1, old=9 |
| 37 | Converted hourly flag | | Hourly=1, regular=9 |
| 38-40 | Total length of report | 10-character word | |

* Whenever value is missing or not applicable, all characters for the parameter will contain "9".

Category/Counter Group

| Character Number(s) | Parameter |
|---------------------|--|
| 41-42 | Category code figure from Surface Data |
| 43-45 | Relative position in report of the next category/counter group.* |
| 46-47 | Number of times data format for category is repeated (i.e., the number of entries) |
| 48-50 | Total number of characters in current category (fill characters not counted) |

* The number of 10-character words in the report which precedes the next category/counter group plus 1.

Surface Data Category 51

| Number of Characters | Parameter | Unit |
|----------------------|-----------------------------------|----------------------------|
| 5 | Sea-level pressure | Tenth of millibar |
| 5 | Station pressure | Tenth of millibar |
| 3 | Wind direction | Degree |
| 3 | Wind speed | Knot |
| 4 | Air temperature | Tenth of degree C |
| 3 | Dewpoint depression | Tenth of degree C |
| 4 | Maximum temperature | Tenth of degree C |
| 4 | Minimum temperature | Tenth of degree C |
| 1 | Quality mark (sea-level pressure) | Character from Table SM.51 |
| 1 | Quality mark (station pressure) | Character from Table SM.51 |
| 1 | Quality mark (wind) | Character from Table SM.51 |
| 1 | Quality mark (air temperature) | Character from |

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|---|---|---------------------|
| | | Table SM.51 |
| 1 | Past weather (W2) | WMO code table 4561 |
| 3 | Horizontal visibility | WMO code table 4300 |
| 3 | Present weather | WMO code table 4677 |
| 2 | Past weather | WMO code table 4561 |
| 2 | Fraction of the celestial dome covered by cloud (N) | WMO code table 2700 |
| 2 | Fraction of the celestial dome covered by all the Cl (Cm) clouds present (Nh) | WMO code table 2700 |
| 2 | Clouds of genera Sc, St, Cu, Cb (Cl) | WMO code table 0513 |
| 2 | Height above ground of the base of the cloud (h) | WMO code table 1600 |
| 2 | Clouds of genera Ac, As, Ns, (Cm) | WMO code table 0515 |
| 2 | Clouds of genera Ci, Cc, Cs, (Ch) | WMO code table 0509 |
| 1 | Characteristic of pressure tendency during the 3 hours preceding the time of observation (a) ** | WMO code table 0509 |
| 3 | Amount (magnitude) of the pressure tendency** | Tenth of millibar |

* See note below.

** When the characteristic of pressure tendency is 9 and the amount of the pressure tendency is not 999, the tendency is a 24-hour pressure change in tenths of millibars unless less than zero. In this case the stored value is the absolute value (in tenths) of pressure tendency plus 500.

*Reference Category 51, sea-level pressure (PPPPP), the following information describes the method for accommodating the possible values encoded in the 4PPPP group of FM 12-VII.

| Characters | Level | Unit |
|------------|-----------|--------------------|
| PPPPP | Sea level | Tenth of millibar |
| 21PPP | 1000mb | Geopotential meter |
| 25PPP | 500mb | Geopotential meter |
| 27PPP | 700mb | Geopotential meter |
| 28PPP | 850mbq | Geopotential meter |
| 29PPP | Unknown | (as reported) |

Surface Data Category 52

| Number of characters | Parameter | Unit |
|----------------------|---------------------------------------|----------------------|
| 4 | Amount of precipitation past 6 hours* | Hundredth of an inch |
| 3 | Total depth of snow on ground** | Inch |
| 4 | Total precipitation past 24 hours* | Hundredth of an inch |
| 1 | Duration of precipitation | Number of 6-hour |

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|---|---|----------------------|
| | observation | periods |
| 2 | Period of waves*** | Second |
| 2 | Height of waves | Half meter |
| 2 | Direction from which swell waves are moving | WMO code table 0877 |
| 2 | Period of swell waves | Second |
| 2 | Height of swell waves | Half meter |
| 4 | Sea surface temperature | Tenth of degree C |
| 2 | Special phenomena, general | **** |
| 2 | Special phenomena, detailed | **** |
| 1 | Ship's course | WMO code table 0700 |
| 2 | Ship's average speed | WMO code table 4451 |
| 7 | Water equivalent of snow and/or ice | Hundredth of an inch |

* Trace is output as 9998.

** Trace is output as 998.

*** No estimate due to confuse sea--output as 98.

**** Special phenomena, general, is missing (99) only if special phenomena, detailed, is missing (99).

**Additional Data
Category 08**

| Number of characters | Parameter | Unit |
|----------------------|---|------------------------------|
| 5 | Data given by specification in Table SM.8a* | Variable |
| 3 | Form of data | Code figure form Table SM.8a |
| 1 | Indicator for specification | Character from Table SM.8b. |
| 1 | Indicator for form | Character from Table SM.8c |

Note--Entries will be ordered as encountered in report.

* Value set "missing" (99999) indicated transmitted as missing.

**Plain Language Data
Category 09**

| Number of characters | Parameters | Unit |
|----------------------|--|---------------------------|
| 1 | Indicator of content of the plain language | Character from Table SM.9 |
| 11 | Plain language data | Alphanumeric text |

**Table SM.1
Report Types**

| Code figure | Type of report |
|-------------|-------------------------------|
| | Land station |
| 511 | By international index number |
| 512 | By call letters |

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|-----|---------------------------------|
| 513 | By latitude-longitude |
| | Ocean station |
| 521 | Fixed (OWS) |
| 522 | Moving ship with name |
| 523 | Moving ship without name |
| | Marine reporting station (MARS) |
| 531 | Fixed (Stationary) |
| 532 | Moving |
| | Quality control data |
| 551 | By latitude-longitude |
| | Buoy |
| 561 | Moored |
| 562 | Drifting |

Table SM.8a
Code figures and Specifications for Category 08

| Code figure | Specification |
|--------------------|---|
| 014 | Station international index number |
| 020 | Altimeter setting in 10 th of mb |
| 021 | Height below which it is clear |
| 080 | Sunshine data (see page C17-2 FMH#2) |
| 081 | Calendar day maximum temperature |
| 082 | Calendar day minimum temperature |
| 083 | Six-hour maximum temperature |
| 084 | Six-hour minimum temperature |
| 085 | Precipitation during past hour |
| 090 | Liquid equivalent of solid precipitation |
| 093 | Sea-level pressure bogus |
| 095 | Satellite moisture bogus |
| 098 | Duration of sunshine for the calendar day |
| 109 | Moored buoy anemometer height |
| 110 to 139 | Raw receipt data in FM-12 (SYNOP), FM-13 (SHIP) and FM-18 (DRIFTER) coded format. Second digit is Section no. (1-3) and third digit is Group no. (0-9). The exception is 119 which is the time of the report. |
| 140 to 149 | Raw receipt data in FM-12 (SYNOP), FM-13 (SHIP) and FM-18 (DRIFTER) coded format for Section no. 5. Third digit is Group no. (0-9). |
| 196 | SSM/I surface wind speed |
| 199 | SSM/I surface temperature |
| 201 | SSM/I soil temperature |
| 202 | SSM/I snow depth |
| 210 | SSM/I surface tag |
| 211 | SSM/I ice concentration |
| 212 | SSM/I ice age |
| 213 | SSM/I ice edge |
| 214 | SSM/I calculated surface type |
| 225 | RESERVED |
| 600 | Original data values which have been corrected by Ocean Products Center manual quality control. |

Table SM.8b

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Indicator for Specification

| Character | Meaning |
|-----------|--------------------------------|
| Blank | Not specified |
| P | Data type is pressure |
| L | Data type is latitude |
| G | Data type is longitude |
| T | Data type is air temperature |
| S | Data type is water temperature |
| W | Data type is wind |

Table SM.8c
Indicator for form

| Character | Meaning |
|-----------|-------------------------------|
| Blank | Not specified |
| 0 | refers to good accuracy |
| 1 | refers to fair accuracy |
| 2 | refers to suspect accuracy |
| 3 | Refers to poor accuracy |
| 7 | refers to out-of-bounds value |

* Applies only to code figures 110 through 139.

Table SM.9
Content of Plain Language Data

| Character | Content |
|-----------|---|
| 1 | Remarks section from SA (hourly) report |
| 5 | Section 5 from 12-VII report or FM13-VII report |

Table SM.51
Markers for Parameters

| Character | Parameter | Meaning |
|-----------|--------------------|---|
| Blank | Any | Not specified |
| H | Any | Monitor requests retention |
| P | Any | Monitor requests non use |
| A | Wind | Ship and buoy reports-wind measurements by anemometer |
| B | Sea-level pressure | Good agreement between sea-level and station pressure |
| C | Sea-level pressure | Missing station pressure for which expected |
| D | Sea-level Pressure | Fair agreement between sea-level and station pressure |
| D | Station pressure | Unreliable sea-level pressure from a ship report |

3. **Start Date:** 19750211

4. **Stop Date:** 19760915

5. **Coverage:**

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- a. Southernmost Latitude: 90.0S
- b. Northernmost Latitude: 90.0N
- c. Westernmost Longitude: -180.0W
- d. Easternmost Longitude: 180.0E

6. **How to Order Data:**

Ask NCDC's Climate Services about the cost of obtaining this data set.
Phone: 828-271-4800
FAX: 828-271-4876
E-mail: NCDC.Orders@noaa.gov

7. **Archiving Data Center:**

Archive Branch
National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801

8. **Technical Contact:**

National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801

9. **Known Uncorrected Problems:** None.

10. **Quality Statement:**

11. **Essential Companion Datasets:**

12. **References:**